



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/565,259	10/17/2006	Michael Bauer	1431.145.101/FIN 606PCT/U	9550
25781 7590 08/12/2009 DICKE, BILLIG & CZAJA FIFTH STREET TOWERS 100 SOUTH FIFTH STREET, SUITE 2250 MINNEAPOLIS, MN 55402				
EXAMINER SLUTSKER, JULIA				
ART UNIT		PAPER NUMBER		
2891				
MAIL DATE		DELIVERY MODE		
08/12/2009		PAPER		

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/565,259

Applicant(s)

BAUER ET AL.

Examiner

JULIA SLUTSKER

Art Unit

2891

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 27 May 2009.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 19-37 is/are pending in the application.
- 4a) Of the above claim(s) 26, 29 and 34 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 19-25, 27, 28, 30-33, 35-37 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 19 January 2006 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date 03/24/2009, 01/19/2006
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date _____
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____

DETAILED ACTION

Election/Restrictions

1. Applicant's election without traverse of Specie IB in the reply filed on 05/27/2009 is acknowledged. Claims 27 and 35 reads on Specie IB.
2. During a telephone conversation with Mark L. Gleason on August 10, 2009 a provisional election was made without traverse to prosecute the Specie IIA. Claim 28 reads on Specie IIA Affirmation of this election must be made by applicant in replying to this Office action.
3. Claims 26, 29, and 34 are withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected Species IA and IIB, there being no allowable generic or linking claim.

Claim Rejections - 35 USC § 102

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

5. Claims 19-25, 31, 36, and 37 are rejected under 35 U.S.C. 102(b) as being anticipated by Hotchkiss (US 6, 239, 013).

Regarding claim 19, Hotchkiss discloses a support (Fig. 4A, numeral 24) with solder ball elements (Fig.4A, numeral 12) for loading substrates with ball contacts (Fig.5, numeral 42), the support comprising: a layer of adhesive applied on one side (Fig.5, numeral 35), the layer of adhesive comprising a thermoplastic or thermosetting

material (column 4, lines 26-36), the adhesive force of which is reduced when irradiated (column 5, lines 29-42); and solder ball elements which are arranged closely packed in rows and columns on the layer of adhesive in a prescribed minimally permissible pitch for a semiconductor chip or a semiconductor component (Fig. 4A, numeral 12).

Regarding claim 20. Hotchkiss discloses that the substrate to be loaded is a semiconductor wafer, and the support includes an arrangement pattern for flip-chip contacts of a multiplicity of semiconductor chips of the semiconductor wafer (column 7, lines 36-42).

Regarding claim 21. Hotchkiss discloses that the substrate to be loaded is a semiconductor chip, and the support includes an arrangement pattern for flip-chip contacts of the semiconductor chip (column 7, lines 36-42).

Regarding claim 22. Hotchkiss discloses that the substrate to be loaded is a printed circuit board of a panel, and the support includes an arrangement pattern for ball contacts of a multiplicity of semiconductor components of the panel (column 7, lines 36-42).

Regarding claim 23. Hotchkiss discloses that the substrate to be loaded is a wiring support of a semiconductor component, and the support includes an arrangement pattern for external contacts of a semiconductor component (column 7, lines 36-42).

Regarding claim 24. Hotchkiss discloses the substrate to be loaded is an intermediate wiring board of a semiconductor component stack, and the support

includes an arrangement pattern for stack contacts of a semiconductor stack component (column 7, lines 36-42).

Regarding claim 25, Hotchkiss discloses a system for loading substrates with solder contacts, the system comprising: a support with a layer of adhesive on one side (Fig.5, numerals 35), the layer of adhesive comprising a thermoplastic or thermosetting material (column 4, lines 36-36), the adhesive force of which is reduced when irradiated (column 5, lines 29-39); solder ball elements arranged closely packed in rows and columns on the layer of adhesive in a prescribed minimally permissible pitch for a semiconductor chip or a semiconductor component (Fig.4A, numeral 12); an irradiating device with a source of radiation and apparatus for selectively irradiating the support to reduce the adhesion of the layer of adhesive for loosening solder ball elements at prescribed positions (column 5, lines 29-29); a removal device for removing the loosened solder ball elements and leaving solder ball elements in an arrangement pattern for flip-chip contacts or ball contacts (column 4, lines 60-67); a loading device for fixing the solder ball elements remaining on the support in a prescribed arrangement pattern on contact areas of the semiconductor wafer or semiconductor chip or the wiring support for semiconductor components; (column 7, lines 36-42) and a pulling-off device for pulling the supports off the ball contacts (Fig.7A).

Regarding claim 31, Hotchkiss discloses a method for loading substrates with solder ball contacts, comprising: producing a tape from support material with a layer of adhesive on one side (Fig.3, numeral 35), comprising a thermoplastic or

thermosetting material (column 4, lines 38-36), the adhesive force of which is reduced when irradiated (column 5, lines 29-39); arranging solder ball elements in rows and columns on the layer of adhesive in a prescribed minimally permissible pitch for a semiconductor chip or for a semiconductor component (Fig.4A, numeral 12); selectively irradiating the support to reduce the adhesion of the layer of adhesive and loosen solder ball elements at prescribed positions (Fig.6, numeral 40, column 5, lines 29-39); removing the loosened solder ball elements and leaving solder ball elements that are fixed on the support in an arrangement pattern for a semiconductor chip or for a semiconductor component (column 4, lines 60-67); soldering the solder ball elements remaining in a predetermined arrangement pattern on the support onto contact areas of a semiconductor wafer or semiconductor chip or wiring support for semiconductor components (column 5, lines 3-10); and pulling the support off the substrate to be loaded with flip-chip contacts or ball contacts (Fig.7A).

Regarding claim 36. Hotchkiss discloses subjecting the support to irradiation over a large surface area (column 5, lines 29-39), and the support is pulled off the ball contacts (Fig.7A).

Regarding claim 37. Hotchkiss discloses a support with solder ball elements for loading substrates with ball contacts, the support comprising: means for providing a layer of adhesive applied on one side (Fig.3, numeral 35), the layer of adhesive comprising a thermoplastic or thermosetting material (column 4, lines 29-39), the adhesive force of which is reduced when irradiated (column 5, lines 29-39); and means for providing solder ball elements arranged closely packed in rows and

columns on the layer of adhesive in a prescribed minimally permissible pitch for a semiconductor chip or a semiconductor component (Fig.4A, numeral 12).

6. Claims 25, 31, and 35 rejected under 35 U.S.C. 102(b) as being anticipated by Wachtler (US 6, 071, 801).

Regarding claim 25, Wachtler discloses a system for loading substrates with solder contacts, the system comprising: a support with a layer of adhesive on one side (Fig.2A, numeral 22), the layer of adhesive comprising a thermoplastic or thermosetting material, the adhesive force of which is reduced when irradiated (column 5, lines 29-36); solder ball elements arranged closely packed in rows and columns on the layer of adhesive in a prescribed minimally permissible pitch for a semiconductor chip or a semiconductor component (Fig.4A, numeral 12); an irradiating device with a source of radiation and apparatus for selectively irradiating the support to reduce the adhesion of the layer of adhesive for loosening solder ball elements at prescribed positions (column 5, lines 20-29); a removal device for removing the loosened solder ball elements and leaving solder ball elements in an arrangement pattern for flip-chip contacts or ball contacts (column 6, lines 58-67); a loading device for fixing the solder ball elements remaining on the support in a prescribed arrangement pattern on contact areas of the semiconductor wafer or semiconductor chip or the wiring support for semiconductor components (column 6, lines 40-45); and a pulling-off device for pulling the supports off the ball contacts (column 2, lines 20-25; column 4, lines 20-25).

Regarding claim 27, Wachtler discloses that the irradiating device includes a UV source and, for selectively irradiating the support with UV rays, a mask holder with masks for UV irradiation of the support at prescribed positions (column 5, lines 20-29).

Regarding claim 31, Wachtler discloses a method for loading substrates with solder ball contacts, comprising: producing a tape from support material with a layer of adhesive on one side (column 5, lines 9-20), comprising a thermoplastic or thermosetting material, the adhesive force of which is reduced when irradiated (column 5, lines 29-30); arranging solder ball elements in rows and columns on the layer of adhesive in a prescribed minimally permissible pitch for a semiconductor chip or for a semiconductor component (Fig.4A, numeral 12); selectively irradiating the support to reduce the adhesion of the layer of adhesive and loosen solder ball elements at prescribed positions (column 5, lines 29-36); removing the loosened solder ball elements and leaving solder ball elements that are fixed on the support in an arrangement pattern for a semiconductor chip or for a semiconductor component; soldering the solder ball elements remaining in a predetermined arrangement pattern on the support onto contact areas of a semiconductor wafer or semiconductor chip or wiring support for semiconductor components (column 6, lines 48-67, Fig.4B)); and pulling the support off the substrate to be loaded with flip-chip contacts or ball contacts (column 2, lines 20-25; column 4, lines 20-25).

Regarding claim 35, Wachtler discloses that the support is selectively irradiated with UV rays through a mask to reduce the adhesion of the layer of adhesive and to loosen solder ball elements at prescribed positions (column 5, lines 29-37).

Claim Rejections - 35 USC § 103

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

8. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

9. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

10. Claim 27 is rejected under 35 U.S.C. 103(a) as being unpatentable over Wachtler.

Regarding claim 27, Wachtler discloses that the irradiating device includes a UV source and, for selectively irradiating the support with UV rays and the masks for UV irradiation of the support at prescribed positions (column 5, lines 20-29).

Wachtler does not disclose a mask holder. Wachtler however discloses that the masks are used for selective radiation (column 5, lines 20-29).

It would have been therefore obvious to one of ordinary skill in the art at the time the invention was made to modify Wachtler to have a mask holder for the masks for the purpose of conveniently applying of radiation.

11. Claim 28 is rejected under 35 U.S.C. 103(a) as being unpatentable over Hotchkiss as applied to claim 25 above, and further in view of Jin (US 5, 591,037).

Regarding claim 28, Hotchkiss discloses removal device for removing the loosened solder ball elements (column 4, lines 60-67). Hotchkiss does not disclose that the removal device includes a roller or a continuous tape, which are provided with tacky surfaces on which loosened solder ball elements remain adhesively attached.

Jin however disclose a solder-carrying medium that includes a continuous tape, which are provided with tacky surfaces on which loosened solder ball elements remain adhesively attached (column 4, lines 30-55).

It would have been therefore obvious to one of ordinary skill in the art at the time the invention was made to modify Hotchkiss with Jin to remove the loosened solder ball by the removal device that includes a continuous tape, which are provided with tacky

surfaces on which loosened solder ball elements remain adhesively attached for the purpose of easy picking the solder ball elements.

12. Claim 30 is rejected under 35 U.S.C. 103(a) as being unpatentable over Hotchkiss.

Regarding claim 30, Hotchkiss discloses adjusting means for aligning the remaining solder ball elements of the support with contact areas of the substrates to be loaded of the holder (column 5, lines 3-9).

Hotchkiss does not disclose that the loading device includes a holder for substrates to be loaded and a support holder for the support with an arrangement pattern of solder ball elements.

Hotchkiss however discloses transferring solder balls from the support (Fig. 4A, numeral 24) to the substrate (Fig. 7B, numeral 14).

It would have been therefore obvious to one of ordinary skill in the art at the time the invention was made to use the support holder for the substrate the support for the purpose of simplification of transferring process.

13. Claim 32 is rejected under 35 U.S.C. 103(a) as being unpatentable over Hotchkiss as applied to claim 31 above, and further in view of Tan (US 2003/0148597).

Regarding claim 32, Hotchkiss discloses forming an adhesive layer on one side of the support (column 4, lines 36-36).

Hotchkiss does not disclose that the adhesive layer is formed by spraying. Tan however discloses forming an adhesive layer by spraying ([0035]).

It would have been therefore obvious to one of ordinary skill in the art at the time the invention was made to modify Hotchkiss with Tan to form an adhesive layer by spraying since it is common process of forming an adhesive layer.

14. Claim 33 is rejected under 35 U.S.C. 103(a) as being unpatentable over Hotchkiss as applied to claim 31 above, and further in view of Yamamoto (US 6, 284, 568).

Regarding claim 33, Hotchkiss discloses that the solder ball elements are adhesively attached on the layer of adhesive in rows in a prescribed minimally permissible pitch for a semiconductor chip of a semiconductor component (Fig.4A).

Hotchkiss does not disclose that the solder ball elements are attached from dispensing nozzles arranged in parallel next to one another.

Yamamoto however discloses attaching the solder ball elements from dispensing nozzles arranged in parallel next to one another (Fig.19).

It would have been therefore obvious to one of ordinary skill in the art at the time the invention was made to modify Hotchkiss with Yamamoto to attach the solder ball elements from dispensing nozzles arranged in parallel next to one another for the purpose of improving productivity (Yamamoto, column 2, lines 55-62).

Conclusion

15. Any inquiry concerning this communication or earlier communications from the examiner should be directed to JULIA SLUTSKER whose telephone number is (571)270-3849. The examiner can normally be reached on Monday-Friday, 8 a.m.-5 p.m. EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Sue Purvis can be reached on (571)-272-1236. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

16. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

JS
August 11, 2009

/Asok K. Sarkar/
Primary Examiner, Art Unit 2891
August 11, 2009